

REMARKS

Favorable reconsideration and withdrawal of the rejection set forth in the final Office Action dated July 21, 2010, are respectfully requested in view of the foregoing amendments and the following remarks.

Status of the Claims

Claims 1-6 are pending in the application, with Claims 1 and 4 being independent. Claims 1, 2, and 4 have been amended. Support for the claim changes can be found in the original disclosure, for example in Figs. 1-6 and the accompanying disclosure, such as in steps S314 and S318 shown in Figure 5, and at page 36, line 18 to page 37, line 9 and page 46, lines 3-11. Therefore, no new matter has been added.

Claim Rejections

Claims 1, 2, 4 and 5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,812,191 (Orava et al.), in view of U.S. Patent No. 7,098,950 (Yamamoto et al.), U.S. Patent No. 6,567,125 (Shimizu), and U.S. Patent No. 6,144,407 (Mizutani et al.).

In response, while not conceding the propriety of the rejection, independent Claims 1 and 4 have been amended. Applicant submits that, as amended, these claims are allowable for the following reasons.

Independent Claim 1 relates to an image pickup apparatus in which a pixel area, including a plurality of pixels each having a photoelectric conversion portion and a common output portion configured to sequentially amplify and output signals from the plurality of pixels included in the pixel area, is formed on a single semiconductor substrate. The apparatus comprises a power

supply unit, a determination unit, and a control circuit. The power supply unit is configured to effect power supply control of the common output portion.

Claim 1 has been amended to recite that the power supply unit is configured to effect power supply control of the common output portion independently of control of the power supply to the plurality of pixels. Claim 1 has also been amended to recite that the determination unit is configured to determine the length of a photo-charge accumulation period of the photoelectric conversion portion in accordance with an exposure detected by photometry processing and a photographing mode.

Claim 1 has been further amended to recite that the control circuit is configured to control the power supply unit in accordance with the length of the photo-charge accumulation period of the photoelectric conversion portion determined by the determination unit, so as to, if the photo-charge accumulation period of the photoelectric conversion portion is determined to be longer than a predetermined accumulation time, stop power supply to the common output portion in a predetermined period after starting photo-charge accumulation in the photoelectric conversion portion and supply power to the common output portion before the end of the photo-charge accumulation period in the photoelectric conversion portion, and to, if the length of the photo-charge accumulation period of the photoelectric conversion portion is determined to be shorter than a predetermined accumulation time, continue to supply the power to the common output portion throughout the photo-charge accumulation period without switching the power supply thereto.

By this arrangement, the apparatus can determine the length of a charge accumulation period of a photoelectric conversion portion in accordance with a detected exposure and a photographing mode. In addition, the apparatus can control the power supply to a common

output portion in accordance with the length of the charge accumulation period. More specifically, if the charge accumulation period is determined to be longer than a predetermined accumulation time, the power supply to the common output unit is controlled in a switching control manner (i.e., power supply is stopped and then started during the photo-charge accumulation period), and if the charge accumulation period is determined to be shorter than the predetermined accumulation time, the power supply to the common output unit is controlled without the switching control (i.e., the power supply is continued throughout the photo-charge accumulation period without switching). In other words, the use of switching control of the power supply to the common output portion depends on the length of the charge accumulation period.

In contrast, the citations to the citations to Orava et al., Yamamoto et al., Shimizu and Mizutani et al. are not understood to disclose or suggest the concept of performing or not performing switching control of the power supply to the common output portion in accordance with the length of the charge accumulation period. In other words, these citations are not understood to relate to the concept of determining whether to stop and start power supply to a common output portion or whether to continue to supply power to the common output portion throughout the photo-charge accumulation period, depending on the determined length of the photo-charge accumulation period. Therefore, the citations to Orava et al., Yamamoto et al., Shimizu and Mizutani et al. are not understood to disclose or suggest a control circuit configured to control the power supply unit in accordance with the length of the photo-charge accumulation period of the photoelectric conversion portion determined by the determination unit, so as to, if the photo-charge accumulation period of the photoelectric conversion portion is determined to be longer than a predetermined accumulation time, stop power supply to the common output portion

in a predetermined period after starting photo-charge accumulation in the photoelectric conversion portion and supply power to the common output portion before the end of the photo-charge accumulation period in the photoelectric conversion portion, and to, if the length of the photo-charge accumulation period of the photoelectric conversion portion is determined to be shorter than a predetermined accumulation time, continue to supply the power to the common output portion throughout the photo-charge accumulation period without switching the power supply thereto, as recited by amended Claim 1.

The Office Action again cites column 6, lines 5-32 of the Shimizu patent to show a control circuit configured to effect control in accordance with a photo-charge accumulation period so as to, if the photo-charge accumulation period of the photoelectric conversion portion is longer than a predetermined accumulation time, supply no power to the common output portion in a predetermined period after starting photo-charge accumulation in the photoelectric conversion portion and to supply power to the common output portion before the end of the photo-charge accumulation period in the photoelectric conversion portion, and to, if the photo-charge accumulation period of the photoelectric conversion portion is shorter than a predetermined accumulation time, supply the power to the common output portion throughout the photo-charge accumulation period.

However, Applicant submits that this portion of the Shimizu patent is understood to disclose that upon receiving an exposure start signal, a circuit 12 outputs a power control signal to an output amplifier power source circuit 68 to reduce electric power to be supplied from the output amplifier power source circuit 68 to an output amplifier 62, and that upon receiving an exposure completion signal, the circuit 12 outputs the power control signal to the output amplifier power source circuit 68 to supply, from the output amplifier power source circuit 68 to

the output amplifier 62, the electric power required to transfer analog image data accumulated in a CCD 6 to the amplifier 62:

According to the above described embodiment, when the camera control circuit 12 receives an exposure start signal, it outputs a power control signal to the output amplifier power source circuit 68 to lower power fed from the output amplifier power source circuit 68 to the output amplifier 62. Therefore, even when the CCD is exposed to light for a long time for detecting very weak light such as chemiluminescence emission or fluorescent light, it is possible to prevent noise caused by heat emitted from the CCD 6 from being generated in the image. Further, when the camera control circuit 12 receives an exposure completion signal, it outputs a power control signal to the output amplifier power source circuit 68 to cause it to feed power capable of transferring analog image data accumulated in the CCD 6 in the form of charges to the output amplifier 62. Therefore, even when a CCD having an extremely great number of pixels is used for obtaining an image of high quality, image data can be read out at high speed. Moreover, when the output signal from the output amplifier 62 stabilizes after power fed from the output amplifier power source circuit 68 to the output amplifier 62 has been increased up to the level enabling the output amplifier 62 to transfer analog image data accumulated in the form of charges, the correcting means 70 produces a correction signal for correcting the offset of the output amplifier 62 and corrects the offset of the output amplifier 62 within a predetermined time period and analog image data accumulated in the CCD 6 in the form of charges are then transferred. Therefore, it is possible to obtain a stable image signal. (col. 6, lines 5-32).

Thus, Applicant finds no support in this passage for the concept of making switching control of the power supply unit (i.e., whether the power supply the common output portion is stopped and started during the photo-charge accumulation period or whether power supply to the common output portion is continued throughout the photo-charge accumulation period without switching the power supply thereto) depend on the determined length of the photo-charge accumulation period.

If the Examiner continues to make the above-noted rejection, Applicant respectfully requests that he further explain how col. 6, lines 5-32 of the Shimizu patent shows this claimed feature.

The Office Action also cites the Yamamoto patent to show a power supply unit configured to effect power supply control of a common output portion and a control circuit configured to effect control to supply no power to the common output portion in a predetermined period after starting photo-charge accumulation and to supply power to the common output portion before the end of a photo-charge accumulation period, as discussed at col. 8, lines 44-54 thereof. However, this passage is not understood to disclose controlling the power supply to a common output portion of an image pickup apparatus in accordance with a determination of the length of the photo-charge accumulation period.

Independent Claim 4 relates to an image pickup apparatus in which a pixel area, including an arrangement of a plurality of pixels each having a photoelectric conversion portion and a common output portion configured to sequentially amplify and output signals from the plurality of pixels included in the pixel area, is formed on a single semiconductor substrate. Claim 4 recites that the apparatus comprises a power supply unit configured to supply a first power level and a second power level lower than the first power level to the common output portion, a determination unit, and a control circuit.

Claim 4 has been amended to recite that the determination unit is configured to determine the length of a photo-charge accumulation period of the photoelectric conversion portion in accordance with an exposure detected by photometry processing and a photographing mode.

Claim 4 has also been amended to recite that the control circuit is configured to control the power supply unit in accordance with the length of the photo-charge accumulation period of

the photoelectric conversion portion determined by the determination unit, so as to, if the photo-charge accumulation period of the photoelectric conversion portion is determined to be longer than a predetermined accumulation time, supply power of the second power level to the common output portion in a predetermined period after starting photo-charge accumulation in the photoelectric conversion portion and supply the first power level to the common output portion before the end of the photo-charge accumulation period in the photoelectric conversion portion, and to, if the photo-charge accumulation time of the photoelectric conversion portion is determined to be shorter than a predetermined accumulation time, continue to supply the first power level to the common output portion throughout the photo-charge accumulation period without switching the power supply thereto.

By this arrangement, the apparatus can determine the length of a charge accumulation period of a photoelectric conversion portion in accordance with a detected exposure and a photographing mode. In addition, the apparatus can control the power supply to a common output portion in accordance with the length of the charge accumulation period, such that if the charge accumulation period is determined to be longer than a predetermined accumulation time, the power supply to the common output unit is controlled in a switching control manner (power is supplied at a second power level and then at a first power level, higher than the second power level, during the photo-charge accumulation period), and if the charge accumulation period is determined to be shorter than the predetermined accumulation time, the power supply to the common output unit is controlled without the switching control (power is continued to be supplied at the first power level throughout the photo-charge accumulation period with switching).

In contrast, the citations to the citations to Orava et al., Yamamoto et al., Shimizu and Mizutani et al. are not understood to disclose or suggest the concept of determining whether to perform this switching control of the power supply (i.e., whether to supply power at the second power level and then at the first power level during the photo-charge accumulation period or whether to continue to supply power at the first power level throughout the photo-charge accumulation period) based on the determined length of the photo-charge accumulation period. Therefore, these citations are not understood to disclose or suggest a control circuit is configured to control the power supply unit in accordance with the length of the photo-charge accumulation period of the photoelectric conversion portion determined by the determination unit, so as to, if the photo-charge accumulation period of the photoelectric conversion portion is determined to be longer than a predetermined accumulation time, supply power of the second power level to the common output portion in a predetermined period after starting photo-charge accumulation in the photoelectric conversion portion and supply the first power level to the common output portion before the end of the photo-charge accumulation period in the photoelectric conversion portion, and to, if the photo-charge accumulation time of the photoelectric conversion portion is determined to be shorter than a predetermined accumulation time, continue to supply the first power level to the common output portion throughout the photo-charge accumulation period without switching the power supply thereto, as recited by amended Claim 4.

Since amended Claims 1 and 4 recite at least one feature not understood to be disclosed or suggested by the citations to Orava et al., Yamamoto et al., Shimizu, Mizutani, Applicant submits that the Office has not yet satisfied its burden of proof to establish a prima facie case of obviousness against amended Claims 1 and 4. Therefore, Applicant respectfully requests that the rejection of amended Claims 1 and 4 be withdrawn.

The dependent claims are also submitted to be patentable, due to their dependency from the independent base claims, as well as due to additional features that are recited. Individual consideration of the dependent claims is respectfully solicited.

Conclusion

In view of the above amendments and remarks, the application is now in allowable form. Therefore, early passage to issue is respectfully solicited.

Any fee required in connection with this paper should be charged to Deposit Account No. 06-1205.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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